

Appl. No. 10/092,868
Amdt. dated 11/9/05
Reply to Office Action of 9/12/05

PATENT
Docket: 010482

REMARKS

Claims 40-45 were pending in the present application. In the above amendments, claims 40, 42, 44 and 45 have been amended, and new claims 46-50 have been added. Therefore, after entry of the above amendments, claims 40-50 will be pending in this application. Applicant believes that the present application is now in condition for allowance, which prompt and favorable action is respectfully requested.

Objection to Claim 45

Claim 45 is objected to as being a substantial duplicate of claim 43. Claim 45 has been amended to be dependent on claim 44.

Rejection of Claims 40-45 Under 35 U.S.C. §103(a)

Claims 40-45 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Nelson (U.S. 2002/0075080) in view of Rogers (U.S. Patent No. 6,680,655) and Pope (U.S. Patent No. 6,163,228).

Nelson describes a PLL circuit having a VCO. The VCO center frequency and VCO gain are automatically calibrated during power up or responsive to a calibration signal. The VCO has several input voltage versus output frequency operating curves. During a calibration phrase, the proper VCO center frequency is selected by selecting one of the operating curves. The VCO gain is then determined using the selected operating curve. (See the Abstract.)

Claim 40 of the present invention, as amended, recites:

"A frequency synthesizer comprising:
a voltage controlled oscillator including a configurable tail current source having a number of switched unit current sources;
a phase locked loop to control a frequency of an oscillating signal of the voltage controlled oscillator; and
an amplitude calibration unit to calibrate the configurable tail current source when the phase locked loop is disabled to achieve a desired amplitude for the oscillating signal,
the amplitude calibration unit detecting a voltage amplitude of the oscillating signal and adjusting the configurable tail current source to achieve the desired amplitude for the oscillating signal,

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wherein the adjusting comprises selecting switched unit current sources in discrete steps until the voltage amplitude falls below a target, the target being variably selectable on the basis of a current mode of operation."

Applicant submits that independent claim 40 is patentable over Nelson in view of Rogers and Pope for at least the following reasons.

First, Nelson does not describe "an amplitude calibration unit to calibrate the configurable tail current source when the phase locked loop is disabled to achieve a desired amplitude for the oscillating signal," as claim 40 recites. The rejection states that this feature of claim 40 is disclosed by unit 30 in FIG. 3 of Nelson. However, unit 30 is actually a VCO gain calibration portion and not an amplitude calibration unit. Nelson states that "VCO gain, K_O , is defined as the ratio of output frequency over input voltage." (See paragraph [0019], second sentence.) VCO gain is thus a measure of how much the output frequency varies for a given change in the input control voltage for the VCO. Nelson measures VCO frequency and not VCO amplitude. This is clearly shown by the fact that frequency detector (FD) 34 is used to detect the difference in frequency between the VCO frequency and a reference frequency. (See paragraph [0023].) The rejection misinterprets block 62 in FIG. 6 of Nelson as detecting the voltage amplitude of the oscillating signal. However, block 58 indicates "perform center frequency calibration", and block 62 (which follows block 58) merely checks the result of the center frequency calibration. In summary, Nelson does not measure the amplitude of the oscillating signal from the VCO and further does not perform amplitude calibration to achieve a desired amplitude for the oscillating signal.

Second, there is no motivation to use the voltage detection/correction scheme of Rogers in the circuit of Nelson, as suggested by the rejection. Nelson deals mainly with VCO frequency whereas Rogers deals mainly with VCO amplitude. The tail circuit 24 of Rogers may be useful for amplitude adjustment but would not be useful for center frequency calibration by Nelson. Hence, there is no motivation to combine Rogers with Nelson.

For at least the above reasons, Applicant submits that claim 40 is patentable over Nelson in view of Rogers and Pope. Claim 41 is dependent on claim 40 and is patentable for at least the reasons noted above for base claim 40.

Independent claims 42 and 44 are patentable over Nelson in view of Rogers and Pope for reasons similar to those noted above for claim 40. Specifically, Nelson does not describe

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"an amplitude calibration unit to calibrate the configurable tail current source when the phase locked loop is disabled to achieve a desired amplitude for the oscillating signal," as recited in each of claims 42 and 44. Furthermore, there is no motivation to combine the tail circuit 24 of Rogers with the VCO of Nelson for the reason noted above for claim 40. Claim 43 is dependent on claim 42, and claim 45 is dependent on claim 44. These dependent claims are patentable for at least the reasons noted for their base claims.

Accordingly, the §103(a) rejection of claims 40-45 should be withdrawn.

New Claims

New claims 46-50 recited additional features of the invention. Claims 46-50 are dependent on claim 40 and are patentable over Nelson in view of Rogers and Pope for at least the reasons noted above for base claim 40.

CONCLUSION

In light of the amendments contained herein, Applicant submits that the application is in condition for allowance, for which early action is requested.

Please charge any fees or overpayments that may be due with this response to Deposit Account No. 17-0026.

Respectfully submitted,

Dated: 11/9/05

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